USN

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019 **Power System Operation and Control**

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO full questions from each part,

PART - A

- What is energy control center? Explain the functions of energy control center. 1 (06 Marks)
 - With block diagram, explain the digital computer configuration of the SCADA system.

(07 Marks)

Explain the parallel operation of generator with infinite bus.

(07 Marks)

What is automatic voltage regulator? Obtain the mathematical modeling of exciter. 2 a.

(07 Marks)

- Two areas are interconnected. The generating capacity of A is 36,000 MW and its regulating characteristic is 1.5% of capacity/0.1 Hz. Area-D has a generating capacity of 40,000MW and its regulating characteristic is 1.0% of capacity/0.1Hz. Find each areas share of a +400 MW disturbance occurring in D and the resulting tie line flow. (05 Marks)
- c. Explain the static performance of the Automatic Voltage Regulator (AVR) loop.
- What is Automatic Load Frequency Control (ALFC)? Obtain the mathematical modeling to 3 close the ALFC loop. (06 Marks)
 - With block diagram, explain the static response of two area system.

(10 Marks)

Determine the primary ALFC loop parameters for a control area having the following data: Total rated area capacity $P_r = 2000MW$

Normal operating load $P_D^O = 1000MW$

Inertia constant H = 5.0sec

Regulation R = 2.4Hz/pu MW

Frequency f = 60 Hz

Take $\partial P_{D}^{O} = 10MW$ and $\partial f = 0.6$ Hz.

(04 Marks)

- Derive an expression to relate voltage, power and reactive power at a node. (06 Marks)
 - b. Explain the method of voltage control by
 - Shunt capacitor and reactor
 - Synchronous compensator. ii)

(07 Marks)

With PV diagram, explain the phenomina of voltage collapse.

(07 Marks)

- What is unit commitment? Explain the constraints in solving the unit commitment problem. 5 (10 Marks)
 - With the help of flow chart, explain the dynamic programming technique. (10 Marks)
- What is system security? Explain the security constrained optimal power flow. (06 Marks) a.
 - With the help of flow chart, explain the contingency analysis. (08 Marks)
 - Explain the DC load flow technique for contingency analysis. (06 Marks)

7	a. What is state estimation? Explain the power system state estimation.	(10 Marks)
	b. Explain the least square technique.	(10 Marks)
8	 a. Define reliability. Explain the mode of failures in a system. b. Derive the following reliability expression: Reliability index. 	(05 Marks)
	ii) Steady state reliability expression.iii) General reliability expression.c. With flow chart, explain the loss of load probability.	(08 Marks) (07 Marks)
About a	****	
a edilar VII		
Anders Th		
Company of the second s		
	6,	
Se Africa de Se	6	
The North Age		
en in the gazhès e fle En la care to		
TRANSMITTER TO THE STREET OF T		
१डग्रह्मस्य से		
gasteld bo gastald bo		
	2 of 2	

10EE82